

3-5 Write and Graph Equations of Lines

Slope-intercept form $y = mx + b$ Standard form $Ax + By = C$ **A, B, & C are integers, A is positive,****A, B, & C have a GCF of 1**

Write the equation of the line given the following information.

1. $(0, 8)$ $m = 3$

$$y = mx + b$$

$$y = 3x + 8$$

2. $(-3, -6)$ $m = 2$

$$y = 2x + b$$

$$-6 = 2(-3) + b$$

$$0 = b$$

$$y = 2x$$

3. $(6, -3)$ $(8, -9)$

$$m = \frac{y_2 - y_1}{x_2 - x_1} \quad \begin{matrix} \text{Rise} \\ \text{Run} \end{matrix} \quad \frac{\Delta y}{\Delta x}$$

$$m = \frac{-9 - (-3)}{8 - 6} = \frac{-6}{2} = -3$$

$$y = -3x + b$$

$$-3 = -3(6) + b$$

$$15 = b$$

$$y = -3x + 15$$

4. Write the equation of the line \perp to $2x + y = 5$ and passes through $(1, -7)$.

$$y = -2x + 5$$

$$m = -2$$

$$m = \frac{1}{2}$$

$$(1, -7)$$

$$y = \frac{1}{2}x + b$$

$$-7 = \frac{1}{2}(1) + b$$

$$-7\frac{1}{2} = b$$

$$y = \frac{1}{2}x - 7\frac{1}{2}$$

$$-2\left(-\frac{1}{2}x + y = -7\frac{1}{2}\right)$$

$$x - 2y = 15$$

Put in standard form. $x - 2y = 15$

5. Write the equation of the line \parallel to $3y - x = 4$ and passes through $(3, 10)$.

$$3y = x + 4$$

$$y = \frac{1}{3}x + \frac{4}{3}$$

$$y = \frac{1}{3}x + 9$$

6. Write the equation of the line \perp to the line containing $(4, 3)$ $(4, 8)$ and passing through $(2, -9)$.

$m = \text{undefined}$
vertical

\perp horizontal

$(2, -9)$

$$y = -9$$

vertical
ex: $x = 7$
horizontal
ex: $y = 7$

7. Write the equation of the perpendicular bisector of \overline{PQ} .

$P(8, 4)$ $Q(12, 6)$

$$M\left(\frac{8+12}{2}, \frac{4+6}{2}\right)$$

$$M(10, 5)$$

Find slope of \overline{PQ}

$$m = \frac{6-4}{12-8} = \frac{2}{4} = \frac{1}{2}$$

$$\perp m = -2$$

line that goes through the midpt

- ① Find midpt
- ② Find slope
- ③ Write eqn.

$$y = -2x + b$$

$$5 = -2(10) + b$$

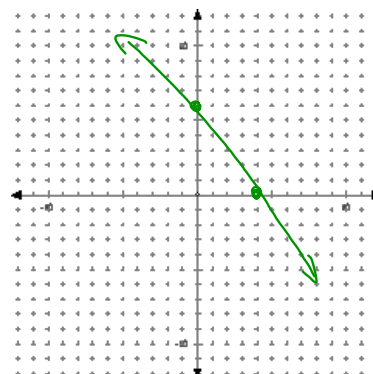
$$25 = b$$

$$y = -2x + 25$$

Graph $3x + 2y = 12$ using intercepts.

$$(0, 6)$$

$$(4, 0)$$



HW p184 #s 16, 17, 22-24, 26, 31, 34, 38, 46

WRITING EQUATIONS Write an equation of the line that passes through the given point P and has the given slope m .

16. $P(-1, 0)$, $m = -1$

17. $P(5, 4)$, $m = 4$

22. **WRITING EQUATIONS** Write an equation of a line with undefined slope that passes through the point $(3, -2)$.**PARALLEL LINES** Write an equation of the line that passes through point P and is parallel to the line with the given equation.

23. $P(0, -1)$, $y = -2x + 3$

24. $P(-7, -4)$, $y = 16$

26. $P(-2, 6)$, $x = -5$

PERPENDICULAR LINES Write an equation of the line that passes through point P and is perpendicular to the line with the given equation.

31. $P(-1, 1)$, $y = \frac{7}{3}x + 10$

34. $P(0, -5)$, $x = 20$

GRAPHING EQUATIONS Graph the equation.

38. $4x - y = -8$

PERPENDICULAR BISECTORS Find the midpoint of PQ . Then write an equation of the line that passes through the midpoint and is perpendicular to PQ . This line is called the *perpendicular bisector* of PQ .

46. $P(-4, 3)$, $Q(4, -1)$